REMARKS

I. INTRODUCTION

A Terminal Disclaimer and a Statement under 37 CFR 3.73(b) are submitted. Claim 1 was amended to more particularly point out and distinctly claim the present invention and claim 7 has been cancelled without prejudice. No new matter has been added. Thus, claims 1-6 remain pending in this application. In view of the following remarks, it is respectfully submitted that all of the presently pending claims are allowable.

II. THE 35 U.S.C. §112 REJECTION SHOULD BE WITHDRAWN

Claims 7 was rejected under 35 U.S.C. §112, Second Paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter of the invention, thereby unpatentable. As the Examiners will ascertain, claim 7 has been cancelled to address. Therefore, it is respectfully submitted that the §112, Second Paragraph, rejection should be withdrawn.

III. THE DOUBLE PATENTING REJECTION SHOULD BE WITHDRAWN

Claims 1-3 and 6 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 6, 13 and 19 of co-pending U.S. Patent Application Serial No. 10/617,389 by Zhao. Claims 1-6 are further rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-17 and 20-24 of U.S. Patent No. 6,600,939 to Zhao. The Terminal Disclaimer along with the Statement under 37 CFR 3.73(b) are filed herewith to address these rejections. Thus, it is respectfully submitted that the obviousness-type double patenting rejections have been overcome and should be withdrawn.

IV. THE 35 U.S.C. §§102 & 103 REJECTIONS SHOULD BE WITHDRAWN

The Examiner rejected claims 1-3 and 5-6 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,801,124 issued to Gamble et al. (hereinafter "Gamble"). Furthermore, claim 4 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Gamble.

Gamble describes a composite ceramic superconductor of improved critical current capacity, strain tolerance, critical current retention and packing factors. The improved properties resulted from the addition of a ceramic laminate that compressively strains the superconductor by at least 0.1%. (*See* Gamble, col. 2, lines 42-59). Gamble requires the use of at least one cladding tape to impose a predetermined load so that the maximum compressive strain is less than the critical compressive strain of the superconducting tapes. (*See id.*, col. 9, lines 34-64).

The applicant's invention, as recited in independent claim 1, relates to a composite superconducting tape characterized by:

> at least one constituent **diffusion-bonded** superconducting tape and
>
> at least one outer layer of metal tape overlying and bonded to one of the exposed major faces thereof with the provision that if there are two such metal tapes they differ in a common strength property.
>
> (*Emphasis added.*)

The applicant's invention recites a composite superconducting tape characterized by at least one constituent **diffusion-bonded** superconducting tape. The Examiner concedes that "Gamble et al. does not teach that the composite is made by diffusion bonding." (Office Action, p.6). However, the Examiner rejects independent claim 1 and argues that "[the diffusion bonding] process limitation does not appear to patentably distinguish the product as claimed over the product of Gamble et al. and so they are believed to be substantially the same." (*Id.*, 6). It is respectfully submitted that the Examiner's arguments are erroneous and that these claims are allowable.

The applicant's invention utilizes at least one constituent diffusion bonded superconducting tape. The diffusion bonded superconducting tape possesses different physical properties than the laminated tapes disclosed by Gamble. The diffusion bond may be formed by

heating the surface of the superconducting tape to a temperature where diffusion of the two surfaces occur. The diffusion bond is formed without the addition of an adhesive. As the Examiner agreed, Gamble does not contemplated diffusion bonding, where surface molecules of the superconducting tapes diffuse to secure a bond, fusing the two surfaces. (*See* Office Action, 6). Rather, Gamble utilizes a lamination technique where a laminate layer coats on to the superconducting tape to secure a bond, adding a layer of laminate between tape surfaces and leaving the surfaces intact. (*See* Gamble, col. 11, lines 15-18; col. 12, lines 11-20). Therefore, the structure of the diffusion bonded tapes, particularly the surfaces of the diffusion bonded tapes, are different from the laminated tapes disclosed by Gamble.

Furthermore, diffusion bonded tapes may exhibit improved AC performance over laminated tapes. The diffusion bonding enables further working of tapes which cannot be performed by the tapes disclosed in the prior art. The further working can include joining tapes together so that subsequent metal forming operations such rolling can be performed. This allows for several of the tapes to be bound together. The resultant composite tape can be continually deformed and further bound to improve performance. The constituent tapes may be stacked together. By stacking together constituent tapes in further processing, it is possible to engineer the tapes with specific properties. By varying the number of tapes in the stack the current carrying capabilities can be varied thereby improving AC performance of the conductor compared to conventional tapes.

It is therefore possible to stack tapes, with or without cladding tape, perform diffusion bonding as part of the powder in tube (PiT) tape manufacturing process, and further deform the stack of tapes, typically by rolling. Uniaxial pressing can also be applied but this has limited application in long-length tape manufacture. Stacking tapes is a way of making a high Ic "composite" structure, however, just stacking, while improving Ic, does not improve Je (the current density where Je=Ic/TOTAL cross sectional area of the stack).

By deforming the diffusion bonded stack we can raise Je because we have the benefit of

high (increased) Ic but the cross sectional area is reduced (compared to as-stacked structure). Performing the additional deformations before sintering is essential since the amount of deformation required would cause cracks in the HTS of a sintered tapes that could not be "repaired." In diffusion bonding, the stack is bonded together by a heat treatment process that has minimal impact on the HTS material, and allows the stack to be deformed to the final dimensions then the final sintering or heat treatment process performed. This post deforming step is not possible without the diffusion bonding step and hence the improvements in Je cannot be realized by the prior art.

For at least the reasons discussed above, Applicant respectfully submits that the diffusion bonding process results in at least one constituent tape which is not like the tape disclosed in Gamble. Because the diffusion bonding process imparts distinctive structural and performance characteristics to the applicant's invention, it is, therefore, patentably undistinguishable from Gamble's laminated tapes. (*See In re Garnero*, 412 F.2d 276, 279, 162 USPQ 221, 223 (CCPA 1979)). Applicant respectfully requests that the Examiner withdraw the 102 rejection to claim 1. Because claims 2-6 depend therefrom and include all the limitations of claim 1, applicant respectfully submits that they are also allowable and requests that the 102 and 103 rejections also be withdrawn.

V. CONCLUSION

In light of the foregoing, Applicant respectfully submits that all of the pending claims are in condition for allowance. All issues raised by the Examiner have been addressed, an early and favorable action on the merits is earnestly solicited.

Respectfully submitted,

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